

REMARKS

The present application was filed on September 15, 1999 with claims 1 through 30. Claims 1 through 30 are presently pending in the above-identified patent application.

In the Office Action, the Examiner rejected claims 1, 12, 22, and 29-30 under 35 U.S.C. §102(e) as being anticipated by Kleider et al. (United States Patent Number 6,487,252 B1). The Examiner also rejected claims 2-10, 13-20, and 23-27 under 35 U.S.C. § 103(a) as being unpatentable over Kleider et al. in view of Rakib et al. (United States Patent Number 6,307,868) and rejected claims 11, 21, and 28 under 35 U.S.C. §103(a) as being unpatentable over Kleider et al. in view of Van Nee (United States Patent Number 6,404,732).

The present invention is directed to techniques for estimating the frequency offset and interleaver synchronization in an OFDM communication system. Certain locations in an OFDM frame, such as adjacent bins, are allocated to a signature sequence. Data is differentially encoded in frequency, so that said frequency offset and interleaver synchronization can be estimated from a single OFDM frame. The frequency offset is estimated at a receiver by determining whether a correlated peak associated with said signature sequence is in an expected location. A beginning of an interleaver block is identified based on a location of a correlated peak associated with the signature sequence.

Independent Claims 1, 12, 22, 29 and 30

Independent claims 1, 12, 22, 29, and 30 were rejected under 35 U.S.C. §102(e) as being anticipated by Kleider et al.

The Examiner asserts that Kleider teaches the “differential encoding in frequency 24” (Fig. 1; col. 4, lines 11-33).

Contrary to the Examiner’s assertion, Applicants note that Kleider teaches that the differential encoding is performed in the time domain. Kleider teaches that “polyphase filter 16 performs an *inverse FFT* on the combined pilot sequence and symbol data as assigned to frequency bins provided from the modulator 14 and pilot sequence generator 18.” (Col. 4, lines 8-11.) Thus, the output of the inverse FFT block (polyphase filter 16) is a signal in the *time domain* that is then differentially encoded by block 24. Similarly, block 32 differentially decodes the received signal in

the time domain, and reverse poly-phase filter 38 performs a FFT to convert the resulting signal into the frequency domain. Independent claims 1 and 22 require “transmitting said signature sequence with data to a receiver, wherein said data and signature sequence are encoded using a differential encoding performed in frequency” and independent claims 12, 29 and 30 require wherein said
 5 received digital signal (that contains a signature sequence in an expected location) is encoded using a differential encoding performed in frequency. Both the *data and the signature sequence* are encoded using a differential encoding performed in frequency.

Thus, Kleider et al. do not disclose or suggest “transmitting said signature sequence with data to a receiver, wherein said data and signature sequence are encoded using a differential
 10 encoding performed in frequency,” as required by independent claims 1 and 22, and do not disclose or suggest wherein said received digital signal (that contains a signature sequence in an expected location) is encoded using a differential encoding performed in frequency, as required by independent claims 12, 29 and 30.

Additional Cited References

15 Rakib has been cited by the Examiner for its disclosure of the details of an interleaver. Rakib does not disclose or suggest techniques for estimating the frequency offset or interleaver synchronization in an OFDM communication system, using differential decoding in frequency.

Van Nee has been cited by the Examiner for its disclosure of a digital modulation system that provides enhanced multipath performance using modified orthogonal codes. Van Nee
 20 does not disclose or suggest techniques for estimating the frequency offset or interleaver synchronization in an OFDM communication system, using differential decoding in frequency.

Dependent Claims 2-11, 13-21 and 23-28

Dependent claims 2-10, 13-20, and 23-27 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kleider et al. in view of Rakib et al. and dependent claims 11, 21, and 28
 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kleider et al. in view of Van Nee.

Claims 2-11, 13-21 and 23-28 are dependent on claims 1, 12 or 22, respectively, and are therefore patentably distinguished over Kleider et al., Rakib et al., and Van Nee (or any combination thereof) because of their dependency from independent claims 1, 12 or 22 for the

reasons set forth above, as well as other elements these claims adds in combination to their base claim.

In view of the foregoing, the invention, as claimed in claims 1-30, cannot be said to be either taught or suggested by Kleider et al., Rakib et al., and Van Nee (or any combination thereof). Accordingly, Applicants respectfully request that the rejection of the claims under 5 U.S.C. §102 and §103 be withdrawn.

All of the pending claims, i.e., claims 1-30, are in condition for allowance and such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at the 10 telephone number indicated below.

The Examiner's attention to this matter is appreciated.

Respectfully submitted,



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